

### (12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

### (19) World Intellectual Property Organization International Bureau



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(43) International Publication Date 4 November 2004 (04.11.2004)

**PCT** 

# (10) International Publication Number WO 2004/095060 A3

(51) International Patent Classification7:

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(21) International Application Number:

PCT/US2004/012110

G01N 23/04

(22) International Filing Date:

20 April 2004 (20.04.2004)

(25) Filing Language:

English

(26) Publication Language:

English

(30) Priority Data: 60/464,843

23 April 2003 (23.04.2003) US

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- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM,

AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

#### Published:

- with international search report
- before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments
- (88) Date of publication of the international search report: 7 April 2005

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

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(54) Title: X-RAY IMAGING TECHNIQUE

(57) Abstract: A security system for detecting contraband such as explosives. The system has a source of radiation and a detector array. A detector array is made of many small detectors, each with a fast response time. The fast response time allows individual radiation photon interactions with each detector to be counted. By counting the number of interactions in an interval of time, the amount of radiation reaching the detector can be measured. The magnitude of the response from the detector to each radiation interaction allows measurement of the energy level of the photons interacting with the detector. Such a system provides significant flexibility in analyzing data collected from items under inspection. For example, objects such as contraband can be identified within the item under inspection by processing the data to accurately determine both the density and type of material.

## INTERNATIONAL SEARCH REPORT

International application No.

PCT/US04/12110

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| A. CLASSIFICATION OF SUBJECT MATTER  IPC(7) : G01N 23/04   |   |   |                                  |
| IPC(7) : G01N 23/04<br>US CL : 378/57  |   |   |                                  |
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| Minimum documentation searched (classification system followed by classification symbols)  |   |   |                                  |
| U.S. : 378/57  |   |   |                                  |
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| 1  | US 5,974,111 A (Krug et al) 26 October 1999 (26.1) See entire document.           | 0.1999)   | 1-84                             |
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| •  | US 5,044,002 A (Stein) 27 August 1991 (27.08.199)<br>See entire document.         | .)  | 1-84                             |
| Y  | US 5,040,199 A (Stein) 13 August 1991.(13.08.199                                  |   | 1.04                             |
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| Date of the actual completion of the international search  Date of mailing of the international search report  |   |   |                                  |
| 240 01 410 41  | completion of the international scarcii   | Date of maning of the international search  | a report                         |
| 07 October 2004 (07.10.2004) 08 FEB 2003   |   |   |                                  |
| Name and mailing address of the ISA/US .   |   | Authorized officer  |                                  |
| Mail Stop PCT, Attn: ISA/US  |   | Authorized officer Craig .E. Church James R. Matthews Telephone No. 703-308-1234    |                                  |
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